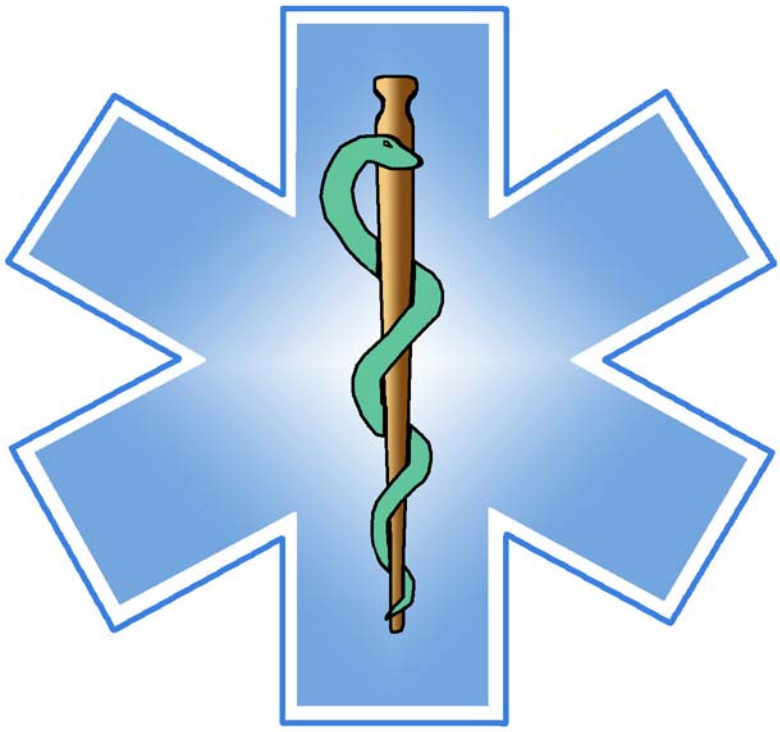
Utah Trauma System

Trauma Assessment

Supplemental educational curricula which can be included in initial First Responder, EMT-B,I,P Courses and TEAM training programs *(may also be used as a continuing education program)*.



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Trauma Assessment Poster

Assessment of the Trauma Patient

Preparation

Trauma is the largest contributing factor to injury and death among the young in the nation and in Utah. Trauma strikes predominately the 1-44 years of age group, the age of greatest productivity**.** Care of the trauma patient in cost alone is staggering, running into billions of dollars annually. Because of the cost of care, the ages involved and resources expended, trauma is classified as a social or public health disease and for the most part, is a preventable disease.

The goal of Utah's trauma system is to match the injured patient's needs to existing resources so that optimal cost effective care is achieved. A rapid, well-organized assessment of a trauma patient plays an important role in identifying treatment interventions and trauma center destination decisions through use of the *Pre-Hospital Trauma Transport Protocol (PTTP).*

Trauma systems are the single most effective way to reduce morbidity and mortality associated with injury.

Prerequisites

Enrolled in a state approved EMT-B, I, P program.
Currently certified as an EMS provider

Materials

AV Equipment: utilize various audio-visual materials relating to trauma systems. The continuous development of new audio-visual materials relating to the subject requires careful review to determine which best meet the needs of the program. Materials should be edited to ensure that the objectives of the curriculum are met.

Resources:

1. Utah Trauma System Trauma Assessment Poster
2. Utah Trauma System Prehospital Trauma Transport Protocol (PTTP).
3. Access the Utah Administrative Code – Chapter 8a and supporting administrative rules through www.health.utah.gov/ems

Personnel

Primary Instructor: at a minimum one currently certified EMT-Instructor in Utah, a trauma coordinator/trauma program manager, TEAM instructor, offline medical director or a trauma service medical director currently serving in this capacity at a Designated Trauma Center.

Assistant Instructor: dictated by audience size.

Minimum Time Needed to Complete: 60 minutes

Purpose

To provide a mechanism for prehospital professionals to determine assessment based criteria for trauma level care and expedite transport to the appropriate trauma center.

Format of Poster

The **Trauma Assessment Poster** is based on the **"ABCD"** (Airway, Breathing, Circulation, and Disability) principle emphasized in state and national EMS curricula.

Physiological indications and the associated traumatic injury that are shown in "RED" indicate the need for trauma center services.

- **Physiological Criteria** – are located within the boxes labeled A, B, C, or D across the top of the poster and are identified as the EMS provider conducts a patient assessment or may be identified any time during a patient care event. Identifying a clinical indicator "qualifies" the patient for inclusion into the trauma system.

- **Revised Trauma Score** with lower scores shown in **RED** indicating the need to transport to the nearest designated Level I or II Trauma Center*.

- **Glasgow Coma Score** with lower scores shown in **RED** indicating the need to transport to the nearest designated Level I or II Trauma Center*.

- **Normal Pediatric Vital Signs**

- **Burn Charts** with lower scores shown in **RED** indicating the need to transport to the nearest designated Level I or II Trauma Center*.

- **Mechanism of Injury** is shown in **RED** to recommend that any of the following may be considered for inclusion and transport to the nearest designated Level I or II Trauma Center*.

- **Risk Factors** are shown in **RED** to recommend that any of the following may be considered for inclusion and transport to the nearest designated Level I or II Trauma Center*.

Special Considerations

- **Time critical injuries –** are clinical indicators located in boxes 1 and 2 of the Utah Trauma System Prehospital Trauma Transport Protocol (PTTP). For these types of injuries and the physiologic conditions, the patient should be taken to a Level I or II Designated Trauma Center as per the PTTP. For all other clinical indicators, at minimum, patients are directed to the closest appropriate facility to stabilize the patient.

- ***Ground and Air Transport time –** If a Level I or II Designated Trauma Center is not available within 30 minutes by ground or air, transport to the closest appropriate facility to stabilize the patient.

- **EMS Provider impression –** The key in identifying clinical indicators through a good patient assessment.

- **Pre-hospital "Trauma Alert"** – timely notification given by an EMS provider to the receiving trauma center allows the mobilization of appropriate resources.

- **Medical Common Sense** – do what is in the best interest of the patient! These decisions are often associated with life threatening injuries. *EMS Providers and emergency personnel should follow a prudent and reasonable course of action that assures the patient's **medical needs** are the driving force behind Trauma Center destination decisions.*

Objectives

Objectives Legend

C = Cognitive P = Psychomotor A = Affective
1 = Knowledge level
2 = Application level
3 = Problem-solving level

Cognitive Objectives

At the completion of this lesson, the participant will be able to:

1. Describe injury as a disease and public health problem. (C-1)
2. State the purpose, objective, and process for use of the *Utah Trauma System Trauma Assessment Poster.* (C-1)
3. State the purpose, objective, and process for use of the *PTTP.* (C-1)
4. Define trauma care facility categorization levels, clinical indicators, time critical injuries, and a pre-hospital trauma alert as they relate to the *Utah Trauma System Trauma Assessment Poster.* (C-1)
5. List the components of and describe the use of the ABCD assessment method for the trauma patient. (C-1)
6. Identify the differences in assessments of the adult trauma patient and the pediatric trauma patient. (C-3)
7. List the components of and describe the use of the Glasgow Coma Scale (GCS) and the Revised Trauma Score (RTS). (C-1)
8. Identify how the GCS and RTS are used with the *Utah Trauma System Trauma Assessment Poster.* (C-2)
9. Calculate a trauma patient's score based on the assessment of the three components of the GCS. (C-3)
10. Calculate a trauma patient's score based on the assessment of the three components of the RTS. (C-3)
11. List the components of the American Burn Association recommendations for treatment of burn victims. (C-2)
12. In a given scenario, apply the *Utah Trauma System Trauma Assessment Poster* (C-1) to identify time critical injuries, method of transport, and trauma care facility destination. (C-2/3)
13. Identify the importance and significance of documentation of the trauma patient. (C-1/2)

Affective Objectives

At the completion of this lesson, the participant will be able to:

1. Value the need of an organized and systematic approach to the care of an injured patient (A-2)
2. Value the need for use of the *Utah Trauma System Trauma Assessment Poster. (*A-2)
3. Value the need for use of the *PTTP (*A-2)
4. Advocate the use of the GCS and RTS for trauma patients.
5. Advocate the use of the rule of nines and the ABA standards in the treatment of burn patients. (A-2)
6. Value the need to complete and leave accurate documentation at the hospital for the Trauma System Quality Improvement process. (A-1)

Psychomotor Objectives

No psychomotor objectives identified.

Presentation

Declarative (What)

I. Trauma Awareness
   A. Injury as a disease
      1. Injury is a preventable disease.
      2. Injury is a public health problem.
         a). Trauma is the leading cause of death among persons ages 1-44.
         b). Trauma is the leading cause of disability for all ages.
         c). Trauma effects the young during their most productive years.
         d). For every fatality related to trauma, there are ten injured people admitted to hospitals and hundreds more treated in emergency departments.

II. Utah's perspective on trauma systems.
   A. Goals of Utah's trauma system
      1. To educate health care providers and policy makers regarding the components of an inclusive trauma system,
      2. Improve overall operation of the trauma system,
      3. To encourage participation in the data collection system,
      4. To provide a foundation for data driven prevention activities and system quality improvement,
      5. To establish guidelines and encourage cooperation of health care providers within the system,
      6. To match prehospital and facility resources with the needs of injured patients,
      7. To ensure optimal care from initial recognition of care to return to the community,
      8. To identify and implement trauma prevention programs (gun safety, water safety, etc),
      9. Ultimately, reduce suffering, Disability, mortality and morbidity from traumatic injuries.

   A. Inclusive Trauma System
      1. Utah's trauma system focuses on all facilities and hospitals as a part of the system.
      2. Utah is striving to develop a trauma system that is fully integrated which allows for the monitoring and tracking of trauma patients along the continuum of care from prevention to rehabilitation.
      3. Five Utah hospitals are currently designated as Trauma Centers at Level I and II. They are:
         - LDS Hospital (Level I),
         - University Medical Center (Level I),
         - Ogden Regional Medical Center (Level II),
         - McKay Dee Hospital (Level II) and
         - Primary Children's Medical Center (Level I Regional Pediatric Trauma Center).

         Other hospitals are looking into becoming designated, thus insuring an all-inclusive system.
      4. Ambulance service programs
         a). Over 145 ambulance service programs

b). 395 transporting ambulances
c). EMT-B = 6,907
d). EMT-I = 1,704
e). EMT-I Adv. = 3
f). EMT IV = 412
g). EMT-P = 911
h). EMT-D = 562
i). Over 13,000 EMS providers (13,299 as of July 1, 2002)

5. Statewide injury prevention initiatives
   a). Statutory Authority to provide educational programs to providers and the public (26-8a-252).
   b). EMSC program is a private/public partnership with BEMS.

III. **Pre Hospital Transport Protocol**

A product (key for EMS) of Utah's trauma system is a statewide standard for patient destination decisions.

The *Pre-Hospital Trauma Transport Protocol* is this standard.

1. This protocol is used to ensure trauma patients with time critical injuries are transported to a designated Level I or II Trauma Center with appropriate resources by assisting the EMS provider in the decision making process for trauma center destination.
2. The EMS provider must have a general understanding of the resources in their geographical service area.
   a). **Level I Trauma Center** – provides the most comprehensive care for the severely injured patient with complex multi-system trauma. Level I Trauma Centers are also responsible for research, resident training, community and outreach education, injury prevention and must be a resource for continuous quality improvement.
   b). **Level II Trauma Center** – provides comprehensive care for the severely injured patient with complex multi-system trauma. Regional trauma care facilities are also responsible for community and outreach education, injury prevention and must be a resource for continuous quality improvement.
   c). **Level III Trauma Center** – provides initial evaluation and stabilization of the severely injured patient including surgical intervention and intensive care capabilities. Inpatient services are provided to patients who can be maintained in a stable or improving condition without specialized care. Those patients needing specialized care are transferred to a Level I or II Trauma Center. The Level III Trauma Center also provides community and outreach education and should be involved in injury prevention programs.
   d). **Level IV Trauma Center** – provides initial evaluation and stabilization of the severely injured patient. Stabilization may include surgical intervention, however most patients needing surgical intervention and or specialty care are transferred to a Level I or II Trauma Center. Level IV Trauma Centers have the necessary equipment and diagnostic resources to resuscitate the severely injured patient. Level IV Trauma Centers also provide continuing education programs for nurses, allied health, and EMS providers and should be involved in injury prevention initiatives.

e) **Level V Trauma Center** – is generally a licensed, small rural facility with a commitment to the resuscitation of the trauma patient and written transfer protocols in place to assure those patients that require a higher level of care are appropriately transferred. They may or may not be staffed with a physician but rather a licensed mid-level practitioner (i.e. nurse practitioner or physician's assistant). This categorization does not contemplate the availability of surgeons, operating rooms nor intensive care units.

IV Trauma Assessment based on ABCD

The focus of this assessment approach is recognition and management of immediate life threatening injuries. Other assessment approaches are still utilized (DCAP-BTLS, AVPU for level of consciousness) but priority as always is for the ABCD's. Performed during the initial assessment, steps usually take less than 30 seconds, unless the need to intervene occurs along the way. Look for causes of airway, breathing and circulation problems.
*Indications shown in **RED** refer to life threatening problems/injuries. Transport patient immediately to the nearest designated Level I or II Trauma Center.*

1. Airway

a. Patent Airway
   i. Can the patient talk?
b. Patent Airway with Assistance
   i. Supplemental oxygen
   ii. Protecting the c-spine with patent airway
   iii. Check for fluid, vomitus, blood or other potential airway obstructions
c. Intubated airway
   i. Consider oral or nasal airway
   ii. Maintain in line stabilization of c-spine
d. Burns to the face
   i. May not complain of respiratory distress initially. May rapidly develop later.
   ii. Tracheal edema.
   iii. Do not delay intubation/airway control/cricothyrotomy if indicated.
e. Inhalation injury (smoke and thermal most common)
   i. Indications for intervention
      1. singed nasal hairs
      2. presence of soot in or around mouth, nares
      3. wheezing, difficulty breathing
      4. decreased LOC
f. Maxillofacial trauma and other facial fractures
   i. Assume that the cervical spine has been injured and use spinal precautions
      1. facial fractures are associated with high percentage of concomitant cervical fractures
   ii. Assess airway for obstruction caused by blood, vomitus, bone fragments, teeth, dentures, damage to the anterior neck
   iii. Apply suction if needed
   iv. Secure and maintain airway
      1. oral
      2. nasal (in absence of suspected facial or basal skull fractures),

3. tracheal intubation, or
4. Cricothyrotomy as indicated.

v. Ensure adequate ventilation and oxygenation
vi. Control bleeding through direct pressure and pressure bandages
vii. Control epistaxis by external direct pressure.

2. Breathing

a. No distress
   i. Reassess and monitor respiratory rate, adequate chest rise and quality during transport
b. Partial assisted
   i. Oxygen supplementation
c. Assisted
   i. Bag Valve Mask
   ii. Endotracheal intubation
d. Decrease in SaO_2 with Oxygen
   i. Mucous membrane color
      1. adequate gas exchange
   ii. Pneumothorax (or tension pneumothorax)
   iii. Hemothorax
   iv. Hypoxemia
      1. Chest integrity
         a. Flail chest
e. Subcutaneous Emphysema
   i. Indicates air is leaking into pleural cavity, sometimes found with a tension pneumothorax.
   ii. Chest decompression
f. Unequal breath sounds
   i. Abnormal breath sounds
   ii. Auscultate all lung fields for more subtle sounds

3. Circulation

a. No evidence of shock
   i. Reassess vitals
   ii. Review signs of shock
      1. skin temp
      2. capillary refill time
      3. color
      4. level of consciousness
      5. diaphoresis
      6. tachycardia
      7. pulse pressure (pediatrics)
b. Tachycardia with peripheral pulses
   i. Assess for pain
   ii. Obtain medication history
   iii. Temperature/fever
   iv. Check for hypotension, warm, dry, skin.
   v. Pulse quality
      1. bilateral
      2. central/peripheral
      3. strength
      4. rate
c. Bradycardia
   i. Cushing's reflex
      1. increased intracranial pressure
      2. hypothermia

d. Decrease in systolic blood pressure
    i. External hemorrhage
        1. warm fluid resuscitation
            a. 2L adults
            b. 20cc/kg pediatrics
    ii. Spinal cord injury
        1. loss of sympathetic nervous system innervation
e. Mottled and cool extremities
    i. hypovolemia
f. No peripheral pulse
    i. Provides a rough estimate of the patient's systolic blood pressure.
        1. radial present = 80 mmHg
        2. femoral present = 70 mmHg
        3. carotid present = 60 mmHg

4. Disability

A. **Glasgow Coma Score (GCS)** – this scoring system is used to identify a patient's level of response. The GCS is a key clinical indicator for identifying time critical injuries. The GCS should be evaluated periodically.

1. Three (3) categories evaluated
    a). **Eye opening** (score of 1-4 points)
        1). Spontaneous = 4 points
        2). To voice = 3 points
        3). To pain = 2 points
        4). None = 1 points
    b). **Verbal response** (score of 1-5 points)
        1). Oriented = 5 points
        2). Confused = 4 points
        3). Inappropriate response = 3 points
        4). Incomprehensible words = 2 points
        5). None = 1 points
    c). **Motor response** (score of 1-6 points)
        1). Obeys commands = 6 points
        2). Localizes pain = 5 points
        3). Withdrawn = 4 points
        4). Flexion = 3 points
        5). Extension = 2 points
        6). None = 1 points

Total Score – sum total of **all** categories (eye opening, verbal response, and motor response). The highest possible score is 15 (best), and lowest possible score is 3 (worst).

a. Alert interactive
b. Reactive to voice stimuli
c. Motor deficit
d. Reactive to painful stimuli
e. Unequal pupils
f. Unresponsive or inappropriate to pain
g. Open fractures

B. Revised Trauma Score (RTS)

1. Assessment of the patient's respiratory rate, systolic blood pressure and Glasgow Coma Score.

a. A range of values for physiological measurements is assigned from 0 to 4.
b. Numbers are added to give a total between 0 and 12.
c. RTS < 10 transport to nearest Trauma Center

V. Burns

A. Thermal Burns
1. Gasses, usually carbon monoxide, are given off. It is important to record if the burn occurred in an enclosed space and what materials were burning.

B. Chemical Burns
1. Usually more localized than thermal burns.
2. Noxious gases often affect the lungs to produce pulmonary insult. Laryngeal and bronchial edema may cause subsequent airway obstruction.
3. Remove dry particles, then flood with water.

C. Electrical Burns
1. Be sure patient is no longer in contact with electrical source
2. Evaluate airway and cardiac status.
3. Patients often suffer from fall injuries.
4. Although the surface area of the burn may be small, involvement of muscle and bone are often extensive.
5. All electrical burns should be seen by physician.

C. Assess the burns by the following criteria.
Note: use of any method to evaluate a burn injury should never delay patient care or transport
1. Percent of body burn:
   a. "Rule of nines"
   b. Provides rough estimate of burn injury size and is most accurate for adults and children older than 10.
2. Depth of burn:
   a. First, second or third degree
3. Age of Patient
4. Site of Burns:
   a. Face, extremities etc.

D. American Burn Association criteria for transport to a Burn Center
1. Second degree burns of > 10% or more of the total body surface area (TBSA) all ages.
2. Third degree any percent- all ages
3. Burns that involves the face, hands, feet, genitalia, perineum, major joints, and long bone fractures.

Adult Care for Burns
1. Trauma and hypovolemia support care
2. Stop the burn process
   a. Remove clothes
   b. Flood with water only if flames not extinguished smoldering present or significant heat still being dissipated.
3. Obtain information regarding possibility of smoke/toxic fume inhalation
   a. 100% O2 NRM
4. Advanced Burn Life Support guidelines for fluid resuscitation:
   a. Indications:
      i. Burns exceeding 20%TBSA and transport time greater than 60 minutes
      ii. Potential for hypovolemic shock from associated injuries.
      iii. Management of life-threatening ventricular arrhythmia's
      iv. Patients requiring ETT

b. IV NS fluid rates for above indications:
   i. 500ml/hour, age >15.
c. Cover burned area with clean, dry sheets or appropriate burn dressing

5. Notify burn center and transport
   a. Transport to nearest acute care facility if patient is in acute respiratory distress.
6. Morphine sulfate, 2 to 10 mg slowly.

Pediatric Care for Burns

1. Trauma and hypovolemia support care
2. Stop the burn process
   a. Remove clothes
   b. Flood with water only if flames not extinguished, smoldering present, or significant heat still being dissipated.
3. Obtain information regarding possibility of smoke/toxic fume inhalation
   a. 100% O2 NRM
4. Advanced Burn Life Support guidelines for fluid resuscitation:
   a. Indications:
      i. Burns exceeding 20%TBSA and transport time greater than 60 minutes
      ii. Potential for hypovolemic shock from associated injuries.
      iii. Management of life-threatening ventricular arrhythmia's
      iv. Patients requiring ETT
   b. IV NS fluid rates for above indications:
      i. 250ml/hour age 5-15.
5. Cover burned area with clean, dry sheets or appropriate burn dressing
6. Notify burn center and transport
   a. Transport to nearest acute care facility if patient is in acute respiratory distress.
7. Morphine sulfate, 0.1mg/kg slowly (not to exceed 5mg).

VI. Documentation

A. Identifies Utah Trauma System issues regarding Quality Improvement.
   1. Hospital Trauma Programs
      a. Multidisiplinary morbidity and mortality reviews to improve service
      b. Education planning, topics for trauma conferences
   2. Pre-hospital Programs
      a. Collection of data will assist in the implementation of Quality Improvement programs within own service.
      b.

B. Utah Trauma System Registry
   1. Intermountain Injury Control Research Center (IICRC)
      a. Repository for trauma data
      b. Provides a more complete picture of the trauma issues in the state
      c. Data entered into registry by trauma registrars at hospitals and IICRC personnel
      d. Prehospital documentation is CRITICAL to improve care for the trauma patient.

References

1. American College of Surgeons Committee on Trauma (ACS COT): *Resources For Optimal Care of the Injured Patient: 1999; Chapter 3: 13-17.*

2. American College of Emergency Physicians (ACEP): Guidelines for Trauma Care Systems. *Ann Emerg Med 1993; 22(6): 1079-1100.*

3. Sanders M*: Paramedic Textbook,* ed 2, St. Louis, Mosby, 2000

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